

CASE HISTORY

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SLOPE STABILIZATION ON UPSTREAM SIDE OF NATURE TRAIL PROJECT AT MALABAR HILL IN D- WARD, MUMBAI MUMBAI, MAHARASHTRA, INDIA



At the Heart of GeoHazard Mitigation Activity

Rockfall Protection

Client:	Products used :
MUNICIPAL CORPORATION OF GREATER MUMBAI (MCGM)	• DOUBLE TWISTED WIRE MESH • TECHRHOMBUS HRC • TECHANCHOR
Main contractor:	
C R SHAH	
Manufacturer & Supplier:	Year of construction:
TECHFAB (INDIA) INDUSTRIES LTD.	2023

Project brief & Problem Description:

Mumbai, the bustling metropolis on the western coast of India, is not only the financial capital but also a city of diverse landscapes and contrasting terrains. Nestled within this vibrant city is the prestigious Malabar Hill, an upscale residential area and home to some of the city's most prominent personalities. Offering a panoramic view of the Arabian Sea, Malabar Hill is renowned for its lush greenery and serene ambiance, making it a sought-after location for recreational spaces such as nature trails.

However, the idyllic charm of Malabar Hill faces a significant challenge in the form of slope instability along the upstream side of a nature trail project. The site presents a geological complexity characterized by a heavily jointed rockmass with inherent weakness planes along the stratification. Particularly during the monsoon season, the area experiences intense rainfall, leading to water percolation into the joints. This influx of water generates pore water pressure, rendering the slope highly susceptible to rockfall. With an average slope angle of 70°, the risk of instability during heavy rains poses a considerable threat to the safety of the area.



Slope Before Protection

Solution Proposed:

The Municipal Corporation of Greater Mumbai (MCGM) has recognized the imperative for intervention in slope stabilization, and TechFab India has proposed an effective solution.

The protective measures include ETA Approved Primary Mesh i.e High Strength Rhomboidal-shaped cable panels known as TechRhombus which cater the big boulders and BIS marked Secondary Mesh i.e. TechFab Metal Mesh, constructed with double twisted hexagonal-shaped wire mesh composite with High strength longitudinal wire rope to hold the small boulders. Combination of Primary and Secondary meshes, anchored with Self Drilling Anchors at top and bottom ensure the stability of the slope.

This innovative approach not only addresses the immediate need for slope stabilization but also incorporates advanced materials and engineering techniques for a robust and enduring solution.



Installation works in progress

Execution at the site :

- The area shall be excavated/scaled up to the levels and slope as per the drawings.
- Drilling and installation of SDA.
- The system is installed with rotary percussive drilling and continuous grouting to cause minimum ground modification and disturbance possible.
- To contain grout, the typical inclination of drill hole is kept at around 10 degrees to horizontal inclining downwards.
- Grout Injection is carried out through hollow steel bar. Injection mixture flows through the holes at the sacrificial drill bit and automatically stabilizes the drilled hole.
- The rolls of DT Mesh are transported to the top of the slope (crane, winch or rope way system may be used) and the rolls are aligned on the upper edge.
- The rolls are opened and extended on the top for the designed run out length and are laid into the trenches over the anchors.
- The adjacent mesh lapping can be done by looping or ring system.
- Installation of TechRhombus Mesh with High Resistant Clip (HRC).
- TechRhombus consists of top and bottom cables which are composed by steel cables galvanized with a Zn-Al alloy galvanization.
- Meshes shall be rolled down till the required length and the base plates shall be fixed over the anchors and mesh and tightened
- Periodic maintenance shall be carried out after each rockfall event by clearing off the debris collected within the draped mesh.
- All connections shall be checked periodically (approx. every 6 months).



Proposed Solution on the Slope



Completed Structure

Conclusion:

The completed structure stands as a testament to engineering prowess and environmental sensitivity, safeguarding the natural beauty of Malabar Hill while ensuring the safety of residents and visitors enjoying the nature trail. The successful implementation of slope stabilization measures not only mitigates the risk of rockfall but also preserves the integrity of this picturesque locale, contributing to the sustainable development of Mumbai's landscape.

For further details kindly contact :

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